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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,293	04/01/2004	Matthew Donofrio	5308-390	8325
20792	7590	02/19/2008		
MYERS BIGEL, SIBLEY & SAJOVEC PO BOX 37428 RALEIGH, NC 27627			EXAMINER CHAMBLISS, ALONZO	
			ART UNIT 2892	PAPER NUMBER
			MAIL DATE 02/19/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/815,293

Applicant(s)

DONOFRIO, MATTHEW

Examiner

Alonzo Chambliss

Art Unit

2892

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 46-51, 53, 76 and 77 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 46-51, 53, 76 and 77 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 August 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 11/2/07
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/29/08 has been entered.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 9/14/07 was filed before the mailing date of the final rejection on 10/27/07. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Response to Arguments

3. Applicant's arguments filed 8/14/07 have been fully considered but they are not persuasive.

In regards to applicant's argument concerning Krames. The response is the same as recited in the final rejection pages 2 and 3 mailed on 10/29/07. Furthermore, applicant states in the specification page 8 lines 1-5 that the plurality of different geometric patterns can be formed in a single patterning of a mask layer.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1, 4, 12, 13, 21, 26, 76, and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krames et al. (US 5,779,924) and Hirokane et al. (US 5,087,535).

With respect to Claims 1, 21, 76, and 77, Krames discloses shaping a surface of a semiconductor layer 1 utilizing a laser to define three-dimensional geometric patterns in the layer 1. The shaping of a surface of the semiconductor layer utilizing a laser to define three dimensional geometric patterns that area angled with respect to the surface of the silicon carbide substrate in the semiconductor layer comprises: patterning a mask layer 5 (i.e. photo sensitive thin film) on the semiconductor layer 1 using a laser (i.e. UV

radiation from a laser) to remove mask material, wherein patterning the mask layer comprises applying laser light to the mask layer at an energy sufficient to remove material from the mask layer while scanning a pattern into the mask layer to form three dimensional geometric patterns in the mask layer. Etching the semiconductor layer 1 using the patterned mask layer 5 to define the three dimensional geometric patterns (col. 6 lines 66 and 67, col. 7 lines 1-67, and col. 8 lines 12-49; Figs. 6, 7a-7c, 8-11, and 13). Krames does not explicitly disclose utilizing an anisotropically etching on a substrate. However, it is well known in the semiconductor industry to anisotropically etching on a substrate with a mask layer as evident by Hirokane (see col. 2 lines 7-20). Krames discloses the claimed invention except for the plurality of geometric pattern including a plurality of different geometric patterns (i.e. randomization features). However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the different geometric patterns for the triangular shape, since changing the shape of the structure is an obvious matter of design choice within ordinary skill in the art and the difference in shape of the structure does not make the device operating differently. In re Peters, 723 F.2d 891, 221 USPQ 952 (Fed. Cir. 1983). Furthermore, it is noted that in the instant specification does not describe different geometric patterns as essential or critical or the only shape that could operate the claimed invention.

With respect to Claim 4, Krames discloses wherein the semiconductor layer comprises the substrate 3 (see Figs. 8-11).

With respect to Claim 12, Krames discloses wherein a plurality of geometric pattern are provided in the surface of the semiconductor layer, wherein the geometric patterns extending into the semiconductor layer and having uninterrupted perimeters at a same level of the semiconductor layer (see Figs. 6, 7a-7c, 8-11, and 13).

With respect to Claims 13 and 26, Krames discloses wherein the surface of the substrate is on a side of the substrate opposite the light-emitting element 20 (i.e. the combination of the plurality of layers). The light-emitting element is on the substrate (see Figs. 13 and 14).

6. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krames et al. (US 5,779,924) in view of Suehiro et al. (EP 1263058).

With respect to Claims 5 and 6, Krames discloses the claimed invention except for the substrate comprising a silicon carbide or sapphire. However, Suehiro discloses a substrate comprising a silicon carbide or sapphire for a light-emitting element (see paragraphs 60-64, 68, and 75). Thus, Krames and Suehiro have substantially the same environment of light-emitting element with patterned semiconductor layer. Therefore, one skilled in the art would readily recognize incorporating a sapphire or silicon carbide as a material for the substrate of Krames, since the sapphire or silicon carbide material would provide a reliable material for transmission of light for the light emitting element as taught by Suehiro.

7. Claims 23, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krames et al. (US 5,779,924) as applied to claim 1 above, and further in view of Jeong et al. (US 6,943,117).

With respect to Claims 23 and 25, Krames discloses the claimed invention except for the mask comprising a polymer mask. The patterning a master template with a laser and embossing the mask layer using the master template. However, Jeong discloses a mask comprising a polymer mask 20 for forming apertures in a layer of material. Patterning a master template 10 with a laser and embossing the mask layer using the master template (see col. 6 lines 55-67 and col. 7 lines 20-30; Figs. 1A-1F). Thus, Krames and Jeong have substantially the same environment of a mask used to form apertures in layer of material. Therefore, one skilled in the art at the time of the invention would readily recognize incorporating a polymer material as the material for the mask of Krames, since the polymer material would facilitate in the desired apertures formed by a laser in the layer of material as taught by Jeong.

With respect to Claims 26 and 27, the combination of Krames and Jeong discloses wherein forming the light-emitting element of Krames (see Figs. 6, 7a-7c, 8-11, and 13) is carried out subsequent to shaping the surface of the substrate in Jeong (see Figs. 1 and 2).

8. Claims 46, 48-52, and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krames et al. (US 5,779,924) in view of Suehiro et al. (EP 1263058) and Watanabe (US2007/0080365).

With respect to Claims 46, Krames discloses patterning a mask layer on a substrate 3 using a laser to remove material from the mask layer 5. Etching the substrate 3 using the patterned mask layer to define the three dimensional geometric patterns (col. 6 lines 66 and 67, col. 7 lines 1-67, and col. 8 lines 12-49; Figs. 6, 7a-7c,

8-11, and 13). Krames discloses the claimed invention except for the plurality of geometric pattern including a plurality of different geometric patterns (i.e. randomization features). However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the different geometric patterns for the triangular shape, since changing the shape of the structure is an obvious matter of design choice within ordinary skill in the art and the difference in shape of the structure does not make the device operating differently. In re Peters, 723 F.2d 891, 221 USPQ 952 (Fed. Cir. 1983). Furthermore, it is noted that in the instant specification does not describe different geometric patterns as essential or critical or the only shape that could operate the claimed invention. Krames fails to explicitly disclose the substrate made of silicon carbide. However, Suehiro discloses a substrate made of silicon carbide (see paragraphs 60-64). Thus, Krames and Suehiro have substantially the same environment of a three dimensional geometric patterns in a semiconductor layer in an optical device. Therefore, one skilled in the art at the time of the invention would readily recognize substitute a silicon carbide substrate for the substrate of Krames, since the silicon carbide substrate provides a stable material for a substrate when creating three dimensional geometric patterns as taught by Suehiro.

With respect to Claim 48, Krames discloses wherein the surface of the substrate is on a side of the substrate opposite the light-emitting element 20 (i.e. the combination of the plurality of layers) (see Figs. 13 and 14).

With respect to Claim 49, it is inherently in the composition characteristic of the mask layer and silicon carbide substrate, that the shape of the pattern of the mask layer

is based on a difference between at etch rate of the silicon carbide substrate and an etch rate of the mask layer.

With respect to Claim 50, Krames discloses forming a micro-mask between the mask layer and the silicon carbide substrate of Suehiro. The micro-mask is configured to roughen a surface of the substrate during etching (see col. 7 lines 33-45).

With respect to Claim 51, Krames discloses a micro-mask comprises a metal. It is well known in the semiconductor industry that aluminum is a metal that can be used in a light-emitting device as evident by Watanabe (see paragraph 27).

With respect to Claims 52 and 53, Krames discloses a single etch and in a single patterning of the mask layer to form a three-dimensional geometric shaped (col. 6 lines 66 and 67, col. 7 lines 1-67, and col. 8 lines 12-49; Figs. 6, 7a-7c, 8-11, and 13). However, Krames fails to disclose the plurality of geometric pattern including a plurality of different geometric patterns (i.e. randomization features). It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the different geometric patterns for the triangular shape, since changing the shape of the structure is an obvious matter of design choice within ordinary skill in the art and the difference in shape of the structure does not make the device operating differently. In re Peters , 723 F.2d 891, 221 USPQ 952 (Fed. Cir. 1983). Furthermore, it is noted that in the instant specification does not describe different geometric patterns as essential or critical or the only shape that could operate the claimed invention.

9. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Krames et al. (US 5,779,924) and Suehiro et al. (EP 1263058) as applied to claim 46 above, and further in view of Boehlen et al. (Laser Micro-machining article).

With respect to Claim 47, Krames-Suehiro discloses the claimed invention except for the mask is a polymer mask. However, Boehlen discloses a mask comprising a polymer mask for forming apertures in a layer of material (see introduction and paragraphs 2.1 and 2.2; Fig. 1). Thus, Krames-Suehiro and Boehlen have substantially the same environment of a mask used to form apertures in layer of material. Therefore, one skilled in the art at the time of the invention would readily recognize incorporating a polymer material as the material for the mask of Krames-Suehiro, since the polymer material would facilitate in the desired apertures formed by a laser in the layer of material as taught by Boehlen.

The prior art made of record and not relied upon is cited primarily to show the process of the instant invention.

Conclusion

10. Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (571) 272-1927.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system Status information for published applications may be obtained from either Private PMR or Public PMR. Status information for unpublished applications is available through Private PMR only. For more information about the PMR system see <http://pair-dkect.uspto.gov>. Should you have questions on access to the Private PMR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or EBC_Support@uspto.gov.